

Remarks

The non-final Office Action mailed September 9, 2005 has been fully considered and this Amendment is submitted in response thereto.

Claims 1-7, 9-19, and 21-24 are pending in the Application. Claims 8 and 20 have been cancelled. No new claims have been added. Claims 1-24 stand rejected. Claim 8 stands objected to. The drawings also stand objected to.

The objection to the drawings under 37 C.F.R. 1.83(a) is respectfully traversed.

The drawings were objected to because they were alleged not to show the collimator of Claim 14, the x-ray focal spot(s) of claims 14-24, and the two cathodes of Claims 5-17. A set of formal replacement drawings accompanies this Amendment. Figures 1-3 of the replacement drawings are unchanged from those filed 10 June 2004. New Figures 4 and 5 have been added to show the collimator of Claim 14, the focal spots of claims 14-25, and the two cathodes of Claims 5 and 17. No new material has been added by these new Figures, as support for each of the items shown in Figures 4 and 5 appears in the specification as originally filed at paragraph [0027], a replacement for which is included by amendment herein to accommodate the new figures. Also, new paragraphs [0008.1] and [0008.2] have been added in the brief description of the drawings to identify the new figures.

For these reasons, it is requested that the objection to the drawings be withdrawn.

The objection to Claim 8 for being indefinite insofar as the type of detector array being specified is respectfully traversed.

Because Claim 8 has been cancelled, this objection no longer applies and should be withdrawn. Claim 20 has also been cancelled.

The rejection of Claims 1-3, 5-7, 9-15, 17-19, and 21-24 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,760,399 ("Malamud") is respectfully traversed.

Malamud is concerned with computerized tomographic (CT) systems, and more particularly with such systems equipped with multiple sources of radiation mounted for rotation around the patient at different locations along the longitudinal axis of the patient or

object, and, further wherein the X-ray beams from each of the sources encompass multiple rows of detectors, col. 1, lines 10-16. Although Malamud discusses wobble in multiple contiguous slice configurations, col. 6, lines 47-55, the wobble in Malamud is clearly an undesired operation. In particular, at col. 6, lines 47-48, Malamud explicitly states that "*Any wobble that occurs in the multiple contiguous slice configurations is correctable...*", [emphasis added] which clearly indicates that the wobble is an uncontrolled and undesired phenomenon in the configurations described in Malamud. Furthermore, the correction merely serves to allow wobbly X-ray fan beams to impinge upon an active element of the detector array. See col. 6, lines 50-53. There is thus no teaching or suggestion of "*controlling a wobble of the focal spot of the radiation source in the z-axis direction during said scanning to selectively preferentially illuminate individual said detector arrays through the scanned object for each view,*" as the wobble in Malamud is an undesired phenomenon that is corrected merely by providing X-ray detectors that are active along a sufficiently long axial dimension, and there is no *selective* preferential illumination that results from any control.

By contrast, Applicant's independent Claim 1, as herein amended, recites, "...controlling a wobble of the focal spot of the radiation source in the z-axis direction during said scanning to selectively preferentially illuminate individual said detector arrays through the scanned object for each view...". See the Application as originally filed at paragraph [0027]. Independent Claims 9, 13, and 21 have been similarly amended, and various dependent claims have also been amended accordingly for consistency with their respective base claims. For these reasons, it is submitted that Claims 1, 9, 13, and 21 are patentable over Malamud.

Claims 2-3 and 5-7 are directly or indirectly dependent upon Claim 1. When the recitations of Claims 2-3 and 5-7 are considered in combination with the recitations of Claim 1, it is submitted that Claims 2-3 and 5-7 are likewise patentable over Malamud.

Claims 10-12 are directly or indirectly dependent upon Claim 9. When the recitations of Claims 10-12 are considered in combination with the recitations of Claim 9, it is submitted that Claims 10-12 are likewise patentable over Malamud.

Claims 14-15 and 17-19 are directly or indirectly dependent upon Claim 13. When the recitations of Claims 14-15 and 17-19 are considered in combination with the recitations of Claim 13, it is submitted that Claims 14-15 and 17-19 are likewise patentable over Malamud.

Claims 22-24 are directly or indirectly dependent upon Claim 21. When the recitations of Claims 22-24 are considered in combination with the recitations of Claim 21, it is submitted that Claims 14-15 and 17-19 are likewise patentable over Malamud.

For the above reasons it is requested that that the rejection of Claims 1-3, 5-7, 9-15, 17-19, and 21-24 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,760,399 ("Malamud") be withdrawn.

The rejection of Claims 5 and 17 under 35 U.S.C. 103(a) as being unpatentable over Malamud as applied to Claims 1-3 and 13-15 above, in view of U.S. Patent No. 5,901,197 ("Khutoryansky et al.") is respectfully traversed.

Malamud is as described above. Malamud does not teach or suggest "*controlling a wobble of the focal spot of the radiation source in the z-axis direction during said scanning to selectively preferentially illuminate individual said detector arrays through the scanned object for each view.*"

Khutoryansky et al. is directed to methods and apparatus for extending the life of an X-ray tube and for predicting the imminent failure of the X-ray tube by controlling the operation of the filaments in X-ray tubes having cathodes containing at least two filaments. Notably, Khutoryansky et al. teach that "the filaments ... are *functionally equivalent*, such that *operation of the tube ... will remain unaffected upon switching from one filament to the next.*" Thus, there is no teaching or suggestion of a controlled functional "wobble" introduced into a CT system by operation of the multiple filaments of an X-ray tube taught by Khutoryansky et al. More particularly, there is no teaching or suggestion of a wobbling that "comprises dynamically controlling the x-ray tube focal spot," nor is there any teaching or suggestion of "*controlling a wobble of the focal spot of the radiation source in the z-axis direction during said scanning to selectively preferentially illuminate individual said detector arrays through the scanned object for each view.*" Thus Khutoryansky et al. adds nothing to Malamud to

teach or suggest the subject matter recited in Claim 1 that makes Claim 1 patentable over Malamud.

Claim 1 is patentable over Malamud, as discussed above, and, for the above reasons, over the combination of Malamud and Khutoryansky et al., as well. Claim 5 is indirectly dependent upon Claim 1. When the recitations of Claim 5 are considered in combination with the recitations of Claim 1, it is submitted that Claim 5 is also patentable over the combination of Malamud and Khutoryansky et al.

Claim 1 is patentable over Malamud, as discussed above, and, for the above reasons, over the combination of Malamud and Khutoryansky et al., as well. Claim 5 is indirectly dependent upon Claim 1. When the recitations of Claim 5 are considered in combination with the recitations of Claim 1, it is submitted that Claim 5 is also patentable over the combination of Malamud and Khutoryansky et al.

Claim 13 is patentable over Malamud for reasons similar to those given above with respect to Claim 1, and, for reasons similar to those given with respect to Claim 1, Claim 13 is also patentable over the combination of Malamud and Khutoryansky et al., as well. Claim 17 is indirectly dependent upon Claim 13. When the recitations of Claim 17 are considered in combination with the recitations of Claim 13, it is submitted that Claim 17 is also patentable over the combination of Malamud and Khutoryansky et al.

For the above reasons, it is requested that the rejection of Claims 5 and 17 under 35 U.S.C. 103(a) as being unpatentable over Malamud as applied to Claims 1-3 and 13-15 above, in view of U.S. Patent No. 5,901,197 ("Khutoryansky et al.") be withdrawn.

The rejection of Claims 4 and 16 as being unpatentable over Malamud as applied to Claims 1-3 and 13-15 in view of U.S. Patent 5,218,533 ("Schanen et al.") is respectfully traversed.

Malamud is as described above. Malamud does not teach or suggest "*controlling a wobble of the focal spot of the radiation source in the z-axis direction during said scanning to selectively preferentially illuminate individual said detector arrays through the scanned object for each view.*"

Schanen et al. is directed to an anti-aliasing filter for use in processing data collected by a CT system. Schanen et al. mention a "spot wobble" scanning technique, col. 2, lines 46-55. However, Malamud teaches only to *correct* for wobbling. Even if there is motivation for combining the teachings of Schanen et al. to "increase the resolution of the x-ray image," there is still no teaching, suggestion, or motivation in Schanen et al. or in Malamud combined with Schanen et al. to "control a wobble of the focal spot of the radiation source in the z-axis direction during said scanning to selectively preferentially illuminate individual said detector arrays through the scanned object for each view." In particular, there is no teaching of controlling a wobble in a z-axis direction, nor is there a teaching of wobbling to selectively preferentially illuminate individual said detector arrays." At most, the combination of Schanen et al. with Malamud would suggest to one skilled in the art that anti-aliasing can be applied to individual detector elements (such as by using a filter operating on a detector element signal 62). Thus, it is submitted that Claims 1 and 13 are patentable over Malamud in view of Schanen et al. for the same reasons given with respect to the rejection over Malamud.

Claim 4 is indirectly dependent upon Claim 1, and Claim 16 is indirectly dependent upon Claim 13. When the recitations of Claims 4 and 16 are considered in combination with those of Claim 1 and 13, respectively, it is submitted that Claims 4 and 16 are likewise patentable over Malamud in view of Schanen et al.

For the above reasons, it is requested that the rejection of Claims 4 and 16 as being unpatentable over Malamud as applied to Claims 1-3 and 13-15 in view of U.S. Patent 5,218,533 ("Schanen et al.") be withdrawn.

The rejection of Claims 8, 10, 20, and 22 under 35 U.S.C. 103(a) as being unpatentable over Malamud in view of U.S. Patent 6,067,342 ("Gordon") is respectfully traversed.

This rejection no longer applies to Claims 8 and 20, which have been cancelled.

Malamud is as described above. (It is, however, noted that the Office's admission that Malamud does not teach the apparatus or method of using a pulsed radiation source to allow the source to be off during wobbling of the focal beam is inconsistent with the Office's assertion that this feature is taught at col. 9, lines 17-22 in the section 102 rejection of Claims

9 and 21. Applicant asserts that "pulsing the radiation source so that the radiation source is off when the focal spot is wobbled between positions in which individual said detector arrays are selectively preferentially illuminated" as recited in Claim 9 and correspondingly recited in Claim 21 is not taught or suggested by "certain scans [using] only some of the source detection systems; while others are not used" nor by "X-ray sources [that] can be energized simultaneously or during separated time slots in order to effectively provide multi-energy modalities." Thus, it is submitted that Claims 9 and 21 are patentable over Malamud for this additional reason.)

Gordon is directed to digital filmless X-ray projection imaging systems and methods having resolution and dynamic range characteristics comparable to or greater than extant photographic film-based imaging systems. As indicated by the office, Gordon does teach the use of a pulsed radiation source that provides a pulsed x-ray beam at col. 6, lines 58-59. However, there is no teaching or suggestion as to how one would incorporate this pulsed source into the apparatus of Malamud or use the teachings of Gordon to avoid errors due to readings taken during the wobble of the beam, much less to control the wobble of the radiation source in the z-direction, or to pulse the radiation source off when the focal spot is wobbled (because the wobble in Malamud is not controlled, only compensated.) Thus, Gordon adds nothing to Malamud to teach or suggest either "controlling a wobble of wobbling the focal spot of the radiation source in the z-axis direction during said scanning to selectively preferentially illuminate individual said detector arrays through the scanned object for each view" or "pulsing the radiation source so that the radiation source is off when the focal spot is wobbled between positions in which individual said detector arrays are selectively preferentially illuminated." Thus, Claims 9 and 21 are patentable over Malamud in view of Gordon.

Claims 10 and 22 depend directly upon Claims 9 and 21, respectively. When the recitations of Claims 10 and 22 are considered in combination with Claims 9 and 21, respectively, it is submitted that Claims 10 and 22 are likewise patentable over Malamud in view of Gordon.

For the above reasons, it is requested that the rejection of Claims 8, 10, 20, and 22 under 35 U.S.C. 103(a) as being unpatentable over Malamud in view of U.S. Patent 6,067,342 ("Gordon") be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,

A handwritten signature in cursive script, reading "Alan Cassel", written in dark ink.

Alan L. Cassel
Registration No. 35,842
ARMSTRONG TEASDALE LLP
One Metropolitan Square, Suite 2600
St. Louis, Missouri 63102-2740
(314) 621-5070

IN THE DRAWINGS

Please amend the drawings by replacing sheets 1-2 of the originally-filed drawings with sheets 1-3 attached hereto.

Sheets 1-2 are unchanged.

Sheet 3 includes new Figures 4 and 5, the contents of both of which are fully supported in the specification as originally filed at paragraph [0027], as explained in detail in the "Remarks" section.